

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning on page 1, line 12, with the following new rewritten paragraph:

a The present invention relates to a cold-accumulating type air conditioning system for a vehicle, provided with a cold accumulator cooled by cold air after passing through a cooling heat exchanger. This air conditioning system is suitably used for a vehicle which temporarily ~~stopping a vehicular~~ stops its engine, which is used as a the drive source of a compressor, ~~at time of a stoppage of when~~ the vehicle ~~or the like~~ stops.

Please replace the paragraph beginning on page 1, line 20, with the following new rewritten paragraph:

a In recent years, ~~as an object in order~~ to protect the environment, a vehicle (economically running vehicle, hybrid vehicle, or the like) automatically ~~stopping an~~ stops its engine ~~thereof at time of a stoppage of when~~ the vehicle stops such as ~~in~~ when waiting for a change of a traffic signal ~~has been practically used~~, and hereafter, there is a tendency to increase the number of these vehicles ~~stopping a vehicle which stop their~~ engine ~~thereof~~ at the stoppage of the vehicle.

Please replace the paragraph beginning on page 2, line 1, with the following new rewritten paragraph:

a In an air conditioning system for a vehicle, a compressor of a refrigerating cycle is generally driven by a vehicular engine. Therefore, in the economically running vehicle or the like described above, at the stoppage of a the vehicle, such as ~~in~~ when waiting for the change of the traffic signal, ~~at every stoppages of the engine~~, the compressor is also stopped. Accordingly, an increase in a the temperature of a cooling

heat exchanger (evaporator) is increased, an air temperature blown into a passenger compartment is increased, and therefore, a reduction in the cooling feeling of a passenger in the passenger compartment is ~~damaged~~ experienced.

Please replace the paragraph beginning on page 2, line 12, with the following new rewritten paragraph:

a JP-A-2000-38015 describes a cold-accumulating type air conditioning system for a vehicle provided with a cold accumulator. In this system, the cold accumulator accumulates cold at time of an operation of a compressor, and air blown into the passenger compartment is cooled by the cold accumulator at a during the stoppage of the compressor (at time of stoppage ~~for~~ the cooling operation of a cooling heat exchanger). However, the cold accumulator is integrally formed with an air mixing door for adjusting an air volume ratio between cold air passing through a bypath passage while bypassing a heating heat exchanger, and hot air passing through the heating heat exchanger. In this case, since the cold accumulator is integrally rotated with the air mixing door, an exposed condition of cold air to the cold accumulator is changed by the rotation of the air mixing door, and a change in the capability of the cold accumulation of the cold accumulator is ~~caused~~ experienced. Further, since the cold accumulator is provided on a surface of the air mixing door at a side of the bypath passage, when the air mixing door is displaced to the closing side of the bypath passage, the capability of the cold accumulation of the cold accumulator is lowered ~~in the end~~.

Please replace the paragraph beginning on page 3, line 22, with the following new rewritten paragraph:

a It is an another object of the present invention to provide a vehicle air

A conditioning system with a cold accumulator, which can restrict a change of a cold-accumulating capability in the cold accumulator due to a position change of an air-conditioning equipment, while simplifying a structure of the cold accumulator.

Please replace the paragraph beginning on page 4, line 1, with the following new rewritten paragraph:

A It is a further ~~another~~ object of the present invention to provide a vehicle air conditioning system with a cold accumulator, which can reduce a ~~compressor consumed~~ the power consumed by a compressor while ~~obtaining~~ obtaining a rapid cold accumulating effect of the cold accumulator.

Please replace the paragraph beginning on page 4, line 6, with the following new rewritten paragraph:

A According to the present invention, in a vehicle air conditioning system, a cold accumulator is disposed between a downstream side of a cooling heat exchanger and an upstream side of an air mixing door in an air flow direction to be cooled by cold air ~~after passing~~ having passed through the cooling heat exchanger. Therefore, the accumulator can be sufficiently cooled by the cold air having passed through the cooling heat exchanger, and a cold-accumulating capacity in the cold accumulator can be stably obtained without being affected by a rotation position of the air mixing door. Further, because the cold accumulator is cooled by cold air from the cooling heat exchanger, the structure of the cold accumulator can be made simple.

Please replace the paragraph beginning on page 4, line 19, with the following new rewritten paragraph:

A Preferably, a bypass passage through which air bypasses the cooling heat

exchanger and the cold accumulator is provided, and a bypass door is disposed to adjust a flow amount of air passing through the bypass passage ~~while bypassing the cooling heat exchanger and the cold accumulator~~. Therefore, when it is unnecessary to decrease the temperature of air blown into a passenger compartment ~~greatly~~, air bypassing the cooling heat exchanger and the cold accumulator is mixed with air passing through the cooling heat exchanger and the cold accumulator, so that a desired temperature of air to be blown into the passenger compartment can be obtained. Accordingly, heat load of the cooling heat exchanger can be reduced, and a the cooling system power required for reducing the temperature in the cooling heat exchanger can be reduced.

Please replace the paragraph beginning on page 5, line 6, with the following new rewritten paragraph:

Preferably, the cold accumulator has at least a first cold accumulating portion and a second cold accumulating portion; ~~the~~ The first cold accumulating portion has therein a first cold accumulating material, and the second cold accumulating portion has therein a second cold accumulating material different from the first cold accumulating material. Therefore, it is possible to change a cold accumulating degree in the cold accumulator based on ~~an~~ the air-conditioning heat load. In addition, the first cold accumulating material has a melting point higher than that of the second cold accumulating material, and the first cold accumulating portion is disposed at an upstream side of the second cold accumulating portion in the air flow direction. Therefore, a temperature difference between cold air from the cooling heat exchanger and the first cold accumulating material can be made larger, and the cold accumulation

of the first cold accumulating material with the higher melting point can be made simple.

Please replace the paragraph beginning on page 5, line 24, with the following new rewritten paragraph:

a In addition, a control unit is disposed to control the temperature of the cooling heat exchanger to a target cooling temperature. In a cold accumulation mode for performing a cold accumulation in the cold accumulator, the control unit sets the target cooling temperature of the cooling heat exchanger at an initial target temperature. Further, when the control unit determines a finish of the cold accumulation in the cold accumulator, the control unit sets the target cooling temperature to be switched from the initial target temperature to a predetermined temperature that is higher than the initial target temperature. Therefore, in the cold accumulation mode, the cold accumulator can be cooled rapidly using a low-temperature cold air corresponding to the initial target temperature of the cooling heat exchanger. On the other hand, after the cold accumulation in the cold accumulator is finished, the temperature of the cooling heat exchanger can be increased. Therefore, when the cooling heat exchanger is an evaporator of a refrigerant cycle, ~~a compressor consumed~~ the power consumed by the compressor can be reduced.

Please replace the paragraph beginning on page 6, line 16, with the following new rewritten paragraph:

a Preferably, after a predetermined time passes after the finish of the cold accumulation in the cold accumulator, the control unit switches the predetermined target temperature to an air-conditioning target temperature determined based on an air-conditioning environment condition. Accordingly, in this case, the power consumed by

a. the compressor ~~consumed power~~ can be further reduced in accordance with the air-conditioning environment condition.

Please replace the paragraph beginning on page 6, line 24, with the following new rewritten paragraph:

a. On the other hand, in ~~an~~ another vehicle air conditioning system according to the present invention, a heating adjustment member is disposed to adjust a heating capacity of a heating heat exchanger, and a cold accumulator is disposed between a downstream side of a cooling heat exchanger and an upstream side of the heating heat exchanger in the air flow direction to be cooled by cold air ~~after-passing~~ having passed through the cooling heat exchanger. In this case, the temperature of air blown into the passenger compartment can be adjusted using the heating adjustment member without using an air mixing door. Accordingly, cold air can be directly introduced into the cold accumulator, and cold accumulating capacity in the cold accumulator can be stably obtained without being affected by an operation position of ~~an~~ the air-conditioning equipment in the vehicle air conditioning system, while the cold accumulator has a simple structure.

Please replace the paragraph beginning on page 11, line 9, with the following new rewritten paragraph:

a. FIG. 1 is a view illustrating an entire constitution of a first embodiment. A refrigerating cycle R of an air conditioning system for a vehicle has a compressor 1 for sucking, compressing, and discharging a refrigerant, and the compressor 1 is provided with an electromagnetic clutch 2 for ~~intermitting~~ intermittent power. Since the power from a vehicular engine 4 is transmitted to the compressor 1 via the electromagnetic

a clutch 2 and a belt 3, an operation of the compressor 1 is ~~intermitted~~ intermittent according to an ~~intermission of a~~ intermittent current carried to the electromagnetic clutch 2 by an air-conditioning electronic control unit (ECU) 5.

Please replace the paragraph beginning on page 12, line 3, with the following new rewritten paragraph:

a A liquid refrigerant from the receiver 7 is decompressed by an expansion valve (pressure reducing ~~mean~~ means) 8 to become in a gas-liquid two ~~phases with phase~~ having a low pressure. The expansion valve 8 is a thermal-type expansion valve having a temperature sensing section 8a for sensing a temperature of an outlet refrigerant of an evaporator (cooling heat exchanger) 9. The low-pressure refrigerant from the expansion valve 8 flows into the evaporator 9. The evaporator 9 is installed inside an air conditioning case 10 of the air conditioning system for a vehicle, ~~the~~ The low-pressure refrigerant flowing into the evaporator 9 absorbs heat from air within the air conditioning case 10 and is evaporated. A refrigerant outlet of the evaporator 9 is coupled to a refrigerant suction side of the compressor 1, and a ~~close~~ closed refrigerant circuit is constructed by the cycle components described above.

Please replace the paragraph beginning on page 13, line 8, with the following new rewritten paragraph:

a In a ventilating system of the air conditioning system, an air conditioning unit 15 arranged downstream of the blower 11 is, normally, disposed at a central position in a width direction of a vehicle ~~in an~~ inside of an instrument panel at a front section inside a passenger compartment, and the blower 11 is arranged in an offset position offset to a side of a front passenger' seat from the air conditioning unit 15. A cold accumulator 40

and an air mixing door 19, which will be described later, are sequentially arranged inside the air conditioning case 10 at downstream air sides of the evaporator 9. A hot-water type heater core (heating heat exchanger) 20 for heating air by utilizing hot water (cooling water) from a the vehicular engine 4 as a heat source is installed downstream of the air mixing door 19.

Please replace the paragraph beginning on page 13, line 22, with the following new rewritten paragraph:

Further, at a sideward part (upward section in FIG. 1) of the hot-water type heater core 20, a ~~bypath~~ bypass passage 21 through which air (cold air) from the evaporator 9 flows while bypassing the hot-water type heater core 20 is formed. The air mixing door 19 is rotatable door in a shape of a plate, and is driven by an electric drive device 22 composed of a servomotor.

Please replace the paragraph beginning on page 14, line 2, with the following new rewritten paragraph:

The air mixing door 19 is a door for adjusting an air volume ratio between hot air passing through the hot-water type heater core 20 and cold air passing through the ~~bypath~~ bypass passage 21, and adjusts ~~an~~ the air temperature blown into the passenger compartment by adjusting the air volume ratio of cold air/ hot air. In the present embodiment, the air mixing door 19 ~~constructs~~ constitutes temperature adjusting ~~mean-of~~ means for air blown into the passenger compartment. A hot air passage 23 extending upward from a bottom side is formed downstream the hot-water type heater core 20, ~~air~~ Air having a desirable temperature can be produced by mixing hot air from the hot air passage 23 and cold air from the ~~bypath~~ bypass passage 21 at

an air mixing section 24.

Please replace the paragraph beginning on page 15, line 25, with the following new rewritten paragraph:

a Here, the evaporator air temperature T_e detected by the evaporator temperature sensor 32 is utilized for the ~~intermission~~ intermittent control of the electromagnetic clutch 2 of the compressor 1. Further, in a case where the compressor 1 is of a variable displacement type, the evaporator air temperature T_e is utilized for a control of ~~a~~ the discharge displacement of the compressor 1. Further, the cooling capability of the evaporator 9 is adjusted by these clutch ~~intermission~~ intermittent control or the control of the discharge displacement of the compressor 1. On the other hand, the cold accumulator air temperature T_c detected by the cold accumulator temperature sensor 33 is utilized for the control of an opening degree of the air mixing door 19 ~~so that the opening degree of the air mixing door 19 is controlled by the cold accumulator air temperature T_c .~~

Please replace the paragraph beginning on page 16, line 13, with the following new rewritten paragraph:

a In the meantime, both the temperature sensors 32 and 33 described above may well be of types having substantially the same degree of temperature responsiveness, ~~however~~ However, in order to restrain a fluctuation of the air temperature blown into the passenger compartment, in particular, it is better to elevate the temperature responsiveness of the cold accumulator temperature sensor 33.

Please replace the paragraph beginning on page 16, line 20, with the following new rewritten paragraph:

a In ~~an~~ the air-conditioning electronic control unit 5 (A/C ECU), detection signals are inputted from both the temperature sensors 32 and 33 described above, and from a well known sensor group 35 for detecting an inside air temperature Tr, an outside air temperature Tam, an amount of solar radiation Ts, and a hot water temperature Tw and the like for the purpose of air conditioning control. Further, onto an air conditioning control panel 36 installed in the neighborhood of the instrument panel inside the passenger compartment, an operation switch group 37 for ~~manually-operated~~ manual operation by a passenger is provided. Operation signals from ~~these~~ the operation switch group 37 are also inputted to the air-conditioning electronic control unit 5.

Please replace the paragraph beginning on page 17, line 17, with the following new rewritten paragraph:

a Further, the air-conditioning electronic control unit 5 is connected to an engine electronic control unit 38 (an engine ECU). Accordingly, from the engine electronic control unit 38 to the air-conditioning electronic control unit 5, a revolutionary speed signal of a the vehicular engine 4, a vehicular speed signal, and the like are inputted.

Please replace the paragraph beginning on page 17, line 23, with the following new rewritten paragraph:

a The engine electronic control unit 38 is for ~~synthetically~~ systematically controlling a fuel injection amount and an ignition timing in the vehicular engine 4 on the basis of signals from a sensor group (not illustrated) for detecting an operation state or the like of the vehicular engine 4. Further, in an economically running vehicle or a hybrid vehicle, when a vehicular stoppage state is determined on the basis of a revolutionary speed signal of the vehicular engine 4, a vehicular speed signal, a brake signal or the

Q like, the engine electronic control unit 38 automatically stops a the vehicular engine 4 by a cutoff of an electronic source of an ignition device, a stoppage of fuel injection or the like.

Please replace the paragraph beginning on page 10 line 8, with the following new rewritten paragraph:

Q Further, after a stoppage of an the engine, when the vehicle is shifted from a vehicular stoppage state to a start state by an operation of a driver, the engine electronic control unit 38 determines the start state of the vehicle on the basis of an acceleration signal or the like, and automatically starts the vehicular engine 4. In addition, the air-conditioning electronic control unit 5 outputs an engine re-operation signal based on an increase of the cold accumulator air temperature Tc or the like, after the stoppage of the vehicular engine 4.

Please replace the paragraph beginning on page 18, line 18, with the following new rewritten paragraph:

Q The air-conditioning electronic control unit 5 and the engine electronic control unit 38 are constructed of a well known microcomputer composed of a CPU, a ROM, a RAM, or the like, and their peripheral circuit. The air-conditioning electronic control unit 5 has an engine control signal output section for outputting signals of stop permission or stop prohibition of the vehicular engine 4 or a signal of the engine re-operation after the stoppage thereof, a compressor ~~intermission~~ intermittent control section due to the electromagnetic clutch 2, an inside/outside air sucking control section due to the inside/outside air switching door 14a, an air volume control section of the blower 11, a temperature control section due to the air mixing door 19, an air outlet mode control

section due to switching of blow outlets 25, 27, and 29, and the like.

Please replace the paragraph beginning on page 21, line 15, with the following new rewritten paragraph:

a ~~As the~~ The cold accumulating material 44, in order to prevent from being frosted over by the evaporator 9, should have a melting point in a range of 6-8°C, ~~further, a~~ and ~~the~~ material ~~having~~ should have a high corrosion preventive operation relative to a constituting quality of material (aluminum) of the cold accumulator 44 ~~is preferable~~. These conditions can be satisfied by paraffin, and paraffin is used as the cold accumulating material 44 in the first embodiment. Paraffin is superior to molten salt and the other inorganics even in aspects such as the chemical stability, the toxicity, and the cost.

Please replace the paragraph beginning on page 21, line 25, with the following new rewritten paragraph:

a Further, the air passage 46 forms a serpentine passage by projecting the convex sections 41a and 42a alternately. Accordingly, in the air passage 46, cold air, while flowing in the serpentine passage, directly contacts surfaces of the heat transfer plates 41 and 42 of respective tubes 45. According to this serpentine configuration, a coefficient of heat transmitting on an air side can be drastically improved by inhibiting a direct ~~advance of an~~ airflow and by disturbing the airflow; ~~even~~ Even if in a finless constitution that has no fin member on the air side, the required heat transmitting performance can be obtained.

Please replace the paragraph beginning on page 22, line 9, with the following new rewritten paragraph:

Next, operation of the vehicle air conditioning system according to the first embodiment will be explained. In the vehicle air conditioning system, the refrigerating cycle R is operated by driving the compressor 1 by the vehicular engine 4, and a temperature of the evaporator 9 is maintained at a temperature in the vicinity of 3°C - 5°C by the ~~intermission~~ intermittent control of the operation of the compressor 1, so that the evaporator 9 is prevented from being frosted.

Please replace the paragraph beginning on page 22, line 17, with the following new rewritten paragraph:

In the evaporator 9, a gas-liquid two phases phase refrigerant with a low temperature and a low pressure decompressed by the expansion valve 8 absorbs heat from air blown by the blower 11 and is evaporated, so that air is cooled in the evaporator 9 and the air blown from the evaporator 9 becomes cold air. Cold air from the evaporator 9, next, passes through the air passages 46 at the predetermined intervals, formed between the plural sets of the tubes 45 of the cold accumulator 40.

Please replace the paragraph beginning on page 22, line 26, with the following new rewritten paragraph:

Because the heat-transmitting coefficient on the air side can be greatly improved by disturbing a cold air flow in the serpentine configuration of the air passages 46, while cold air passes through the air passages 46, the cold accumulating material (paraffin) 44 can be effectively cooled via the heat transfer plates 41 and 42. As a result, the cold accumulating material 44 is cooled and solidified from a liquid phase state ~~in~~ at a normal room temperature to a solid phase, and cold accumulation can be performed in the configuration of latent heat of fusion.

Please replace the paragraph beginning on page 23, line 9, with the following new rewritten paragraph:

Thus, in an economically running vehicle that automatically stops the engine 4 in with the stoppage of the vehicle (when no engine power is required), such as in waiting for a change of a traffic signal, even if the compressor 1 of the refrigerating cycle R ~~becomes the stoppage state~~ stops at the time of stoppage of the vehicle, the air temperature blown into the passenger compartment can be maintained comparatively in a low temperature state by utilizing a cold accumulating amount of the cold accumulating material (paraffin) 44. During cooling in a summer period, an abrupt increase in the air temperature blown into the passenger compartment, due to the stoppage of the compressor 1, can be restrained, and worsening of a cooling feeling can be prevented.

Please replace the paragraph beginning on page 24, line 9, with the following new rewritten paragraph:

As a specific example of the cold accumulating material 44, in a case where the cold accumulating material 44, utilizing 300cc of paraffin having the melting point of 8, in the cold accumulator 40 in FIG. 2 is cooled by cold air at a temperature of 3 - 5 after passing through the evaporator 9, the cold accumulation (solidification) of the cold accumulating material 44 can be completed in about one minute. On the other hand, even in a stoppage state of ~~an~~ the engine 4 (compressor 1), the passenger compartment can be sufficiently cooled ~~during~~ for about one minute by 300cc of the cold accumulating material 44 in which the cold accumulation has been completed.

Please replace the paragraph beginning on page 24, line 27, with the following new rewritten paragraph:

a As shown in FIG. 3, two pieces of heat transfer plates 410 and 420 are molded into a shape swelled out in a ~~bawl~~ bowl shape respectively to an outward direction. By bonding the two pieces of the heat transfer plates 410 and 420 in a hollow shape, a tube 430 can be formed. Further, corrugate type fins 440 folded and bent in a wave shape and the tubes 430 are alternately stacked on each other in the vertical direction in FIG. 3. The portions between the heat transfer plates 410 and 420 of each tube 430 and the portions between each fin 440 and each tube 430 are bonded with each other by brazing of aluminum. After the brazing, the cold accumulating material 44 is filled and hermetically sealed in an inner section space of each tube 430.

Please replace the paragraph beginning on page 25, line 13, with the following new rewritten paragraph:

- a In the above-described first and the second embodiments, the heat transfer plates 41, 42, 410, and 420 are formed by respectively separate thin plate materials. However, one piece of thin plate material having a magnitude equivalent to two pieces of the heat transfer plates is bent in a U-shape at a central section thereof, and the tube 45 of the first embodiment or the tube 43 of the second embodiment may well be molded.

Please replace the paragraph beginning on page 27, line 12, with the following new rewritten paragraph:

a In the first embodiment described above, the cold accumulator 40 is disposed at a downstream air side of the evaporator 9 and at an upstream air side of the air mixing

door 19. However, in a fifth embodiment, as illustrated in FIG. 7, the cold accumulator 40 is arranged downstream of the evaporator 9, further, upstream a heater core 20 in the air flow direction A.

Please replace the paragraph beginning on page 28, line 4, with the following new rewritten paragraph:

In the first embodiment described above, the front surface area of the cold accumulator 40 is the same as that of the evaporator 9, so that the entire volume of cold air after passing through the evaporator 9 passes through the cold accumulator 40. However, in the sixth embodiment, as illustrated in FIG. 8, the front surface area of the cold accumulator 40 is made smaller than that of the evaporator 9, so that a ~~bypath~~ bypass passage 49 of the cold accumulator 40 is formed. Therefore, the entire volume of cold air after passing through the evaporator 9 does not pass through the cold accumulator 40, but a part of cold air bypasses the cold accumulator 40.

Please replace the paragraph beginning on page 28, line 17, with the following new rewritten paragraph:

In the above-described first through sixth embodiments, the front surface area of the evaporator 9 is made the same as a passage sectional area inside the air conditioning case 10 so that an entire volume of air blown by the blower 11 passes through the evaporator 9. However, in the seventh embodiment, as illustrated in FIG. 9, the front surface areas of the evaporator 9 and the cold accumulator 40 are made identical with each other, a ~~bypath~~ bypass passage 50 through which air bypasses the evaporator 9 and the cold accumulator 40 is formed inside the air conditioning case 10, and a plate-like ~~bypath~~ bypass door 51 is rotatably arranged in an inlet section of the

a ~~bypath~~ bypass passage 50. The ~~bypath~~ bypass door 51 adjusts an opening degree of the ~~bypath~~ bypass passage 50 to adjust an air volume bypassing the evaporator 9.

Please replace the paragraph beginning on page 29, line 16, with the following new rewritten paragraph:

a Thus, in the seventh embodiment, when the temperature of the evaporator 9 is not need to lower lowered to a temperature equal to or below the melting point of the cold accumulating material 44 such as the intermediate period, the ~~bypath~~ bypass passage 50 is opened by the ~~bypath~~ bypass door 51, so that a part of air blown by the blower 11 flows through the bypass passage 50 while bypassing the evaporator 9 and the cold accumulator 40. In this case, cold air having a temperature equal to or lower than the melting point of the cold accumulating material 44 passes through the evaporator 9 and the cold accumulator 40 and is mixed with a ~~bypath~~ bypass air (sucking air of evaporator) not cooled by the evaporator 9 and having a high temperature, so that a target air temperature can be obtained.

Please replace the paragraph beginning on page 30, line 2, with the following new rewritten paragraph:

a Specifically, an opening degree of the bypass door 51 can be set based on the air temperature T_c from the cold accumulator 40 detected by the temperature sensor 33, the temperature of bypass air (sucking air of evaporator) passing through the bypass passage 50 and the target air temperature blown into the passenger compartment. In the meantime, since ~~bypath~~ bypass air (sucking air of evaporator) is inside air or outside air, the temperature of bypass air can be obtained on the basis of the inside air temperature T_r or the outside air temperature T_{am} detected by the sensor

group 35.

Please replace the paragraph beginning on page 30, line 18, with the following new rewritten paragraph:

a: An object of the eighth embodiment is to obtain a cold accumulator structure which can reduce manufacturing cost while maintaining performance of cold accumulation and cold discharging. FIGS. 10 and 11 show a comparison example of the eighth embodiment. FIG. 10 shows a sectional view of the tube 45 corresponding to that of in FIG. 2, and FIG. 11 shows an entire sectional view of the cold accumulator 40 which is obtained by laminating and brazing the tubes 45 in FIG. 10 in a lateral direction. In this case, as shown in FIG. 11, tank sections 45a and 45b are formed at top and bottom end sections of the tubes 45, filling ports 45c of the cold accumulating material 44 are provided at both lateral ~~both~~ end sections of the respective tank sections 45a and 45b, and the filling ports 45c are sealed by lid members 52 after the cold accumulating material 44 are filled from the filling ports.

Please replace the paragraph beginning on page 34, line 14, with the following new rewritten paragraph:

a: Thus, in the eighth embodiment, there is no ~~necessary~~ need for press-forming the heat transfer plates 41 and 42 by an exclusive press die for every size of the cold accumulator 40, and a brazing process is also not required.

Please replace the paragraph beginning on page 34, line 18, with the following new rewritten paragraph:

a: Further, because the opening section of the end of the tube 60 can be utilized as a filling port of the cold accumulating material 44, it is only necessary to hermetically

Q seal the opening section of the end of the tube 60 after ~~filled~~ filling with the cold accumulating material 44. Therefore, the structure of the cold accumulator 40 can be made simple.

Please replace the paragraph beginning on page 41, line 1, with the following new rewritten paragraph:

Q When the air conditioning heat load is lowered such as in an intermediate period of the spring and the autumn, there is generated a case where a target temperature of air blown from the evaporator 9 can be elevated to a temperature ~~at a degree~~ of 10°C, for example, based on the air conditioning heat load.

Please replace the paragraph beginning on page 41, line 7, with the following new rewritten paragraph:

Q When the cold accumulating material 44 inside the cold accumulator 40 is only one kind of paraffin having a melting point at 8°C, even in an intermediate period of the spring and the autumn, it is necessary to set the air temperature of the evaporator 9 at a low temperature ~~of a degree~~ of 3°C for the purpose of the cold accumulation. As a result, a cooling capability of the evaporator 9 in the intermediate period is increased more than necessary, and the driving power of the compressor is increased.

Please replace the paragraph beginning on page 41, line 16, with the following new rewritten paragraph:

Q In the thirteenth embodiment, in view of ~~a respect~~ what was described above, as illustrated in FIG. 20, as a cold accumulator, a plurality of cold accumulators 40a and 40b sealed with at least two ~~kind~~ kinds or more of the cold accumulating material 44 having which have different melting points are used. In the thirteenth embodiment, as

a. the cold accumulators 40a and 40b, various constitutions explained in the above-described embodiments can be used.

Please replace the paragraph beginning on page 41, line 24, with the following new rewritten paragraph:

a. When the thirteenth embodiment is more specifically explained, both the cold accumulator 40a and 40b are arranged in a series downstream of the evaporator 9 in the air flow direction A. Further, the cold accumulating material 44 having a high melting point (for example, 15°C) is sealed in the upstream cold accumulator 40a, and the cold accumulating material 44 having a low melting point (for example, 8°C) is sealed in the downstream cold accumulator 40b.

Please replace the paragraph beginning on page 42, line 15, with the following new rewritten paragraph:

a. On the contrary, when the air conditioning heat load is small such as in a condition of intermediate period of the spring and the autumn, since the target air temperature of the evaporator 9 required from the air-conditioning heat load becomes sufficiently higher as compared with that in the summer condition, the target air temperature of the evaporator 9 can be switched to a higher temperature (for example, 10°C) than the melting point of the cold accumulating material 44 ~~in~~ with the low melting point (for example, 8°C).

Please replace the paragraph beginning on page 44, line 16, with the following new rewritten paragraph:

a. ~~On the contrary~~ Contrary to that, in the thirteenth embodiment, cold air at the temperature of 10°C after passing through the evaporator 9, firstly flows through the

Q cold accumulator 40a, and cools the cold accumulating material 44 inside the cold accumulator 40a by cold air immediately after passing through the evaporator 9. Accordingly, a temperature difference between cold air and the cold accumulating material 44 inside the cold accumulator 40a can be increased, the cold accumulating material 44 having the high melting point can be effectively cooled, and the cold accumulating performance of the cold accumulating material 44 having the high melting point can be improved.

Please replace the paragraph beginning on page 47, line 9, with the following new rewritten paragraph:

Q As described in the first embodiment, as a cold accumulating material 44, a material in which latent heat can be accumulated according to a phase change is selected. At that time, a material with the larger ~~is the~~ solidification latent heat per unit volume is preferred, the larger solidification heat per unit volume becomes a cold accumulation density ~~is preferable~~. Accordingly, a specific quality of the cold accumulating material 44 is selected by ~~synthetically~~ systematically considering a temperature to be cold accumulated, a heat amount to be cold accumulated, a quality of material of the cold accumulator 40, and cost of the cold accumulating material, and the like.

Please replace the paragraph beginning on page 47, line 20, with the following new rewritten paragraph:

Q In the seventh embodiment, a main object of the cold accumulator 40 is for cooling in a summer period in the vehicle air conditioning system. Accordingly, as a specific quality of the cold accumulating material 44, the paraffin having a solidifying

point T0 of about 8°C is selected ~~from~~ for the reasons that the temperature Tc of the cold accumulator 40 is desirably ~~restrained to~~ kept at a temperature below ~~a degree of~~ 15°C, that a cold accumulating material is preferably solidified at a temperature equal to or higher than 0°C in order to prevent the evaporator 9 from being frosted over, and that a corrosion preventive operation relative to a constituting quality of material (aluminum) for the cold accumulator can be obtained, and the like.

Please replace the paragraph beginning on page 49, line 8, with the following new rewritten paragraph:

In the equation 1, the α and F are constant values decided by the specification of the cold accumulator 40, and the Tc' is a constant temperature (solidifying temperature T0) decided by a quality of the cold accumulating material 44 after starting solidification of the cold accumulating material 44. In order to complete the cold accumulation in a short time ~~in every way~~, the air temperature Te of the evaporator 9 ~~can~~ should be set to the temperature as low as possible. However, when $T_e < 0^\circ\text{C}$, the evaporator 9 is frosted (freezing of condensed water), thus there causes a problem that cooling capability of the evaporator 9 is lowered.

Please replace the paragraph beginning on page 49, line 19, with the following new rewritten paragraph:

Thus, the present inventors, firstly set a target evaporator temperature TEOB (that is, evaporator air temperature Te) during the cold accumulation ~~is set~~ to 1°C, and studied the cold accumulating behavior in a comparison example. In the comparison example shown in FIG. 25, the maximum cooling accumulation state (the maximum cooling capability Q) is set in a range in which the evaporator 9 can be prevented from

a being frosted. FIG. 25 shows a result showing the cold accumulating behavior of the comparison example.

Please replace the paragraph beginning on page 50, line 2, with the following new rewritten paragraph:

a When the maximum cold accumulation (MCA) state described above is set when $TEO = 1^{\circ}\text{C}$, since the cold accumulating material 44 can be rapidly cooled by a low-temperature cold air of 1°C , as illustrated in the solid line A in FIG. 25, a temperature (cold accumulator air temperature T_c) of the cold accumulating material 44 can be lowered abruptly ~~from a temperature before starting cooling~~. In the seventeenth embodiment, ~~since~~ paraffin having the solidifying point $T_0 = 8^{\circ}\text{C}$ is utilized as the cold accumulating material 44. Accordingly, when the temperature of the cold accumulating material 44 is lowered to the temperature of 8°C , the solidification of the cold accumulating material 44 is started, and the solidifying latent heat of the cold accumulating material 44 is absorbed from low-temperature cold air of 1°C . Further, during this solidification of the cold accumulating material 44, since the temperature of the cold accumulating material 44 is maintained at 8°C of the solidifying point T_0 , the air temperature T_c blown from the cold accumulator 40 is substantially maintained at a constant value of 8°C .

Please replace the paragraph beginning on page 51, line 24, with the following new rewritten paragraph:

a Next, a specific cold accumulation control according to the seventeenth embodiment will be explained. FIG. 27 shows a flow diagram illustrating an air-conditioning control carried out by a microcomputer of the air-conditioning electronic

a control unit 5. The control routine illustrated in FIG. 27 is started, when the ignition switch of the vehicular engine 4 is turned on and an electric power is supplied to the electronic control unit 5, and when the air volume switch 37b (or automatic switch) of the operation switch group 37 of the air-conditioning control panel 36 is turned on.

Please replace the paragraph beginning on page 55, line 10, with the following new rewritten paragraph:

a On the other hand, at time of high temperature in a summer period in which the outside air temperature T_{am} exceeds 25°C , the TEOA2 is lowered in inversely proportional to an increase of the outside air temperature T_{am} in order to secure cooling capability. Further, in a low temperature area where the outside air temperature T_{am} becomes lower than the temperature of 10°C , in order to secure dehumidifying capability for the purpose of preventing a cloud of the window glass, the TEOA2 is lowered along with a reduction in the outside air temperature T_{am} .

Please replace the paragraph beginning on page 57, line 4, with the following new rewritten paragraph:

a Next, the program is advanced to step S210, an applied voltage V_c to the electromagnetic clutch 2 is determined by comparing the target evaporator temperature TEOA with the evaporator air temperature T_e detected by the temperature sensor 32, and an ~~intermission~~ intermittent operation (ON-OFF) of the compressor 1 is determined. That is, when the evaporator air temperature T_e is lowered below the target evaporator temperature TEOA, engagement of the clutch becomes OFF (interlocking of compressor becomes OFF) by setting the applied voltage V_c to 0V. Further, when the evaporator air temperature T_e is increased to higher than $\text{TEOA} + a$, engagement of

a the clutch becomes ON (interlocking of compressor becomes ON) by setting the applied voltage V_c to 12V. In $(TEOA + a)$, a denotes a hysteresis width of an intermission control of the compressor, and normally is ~~a degree of~~ 1°C . Accordingly, at step S210, the operation of the compressor 1 can be controlled.

Please replace the paragraph beginning on page 58, line 16, with the following new rewritten paragraph:

a On the other hand, when the cold accumulating mode is selected at step S130, a target evaporator temperature TEOB for the cold accumulation is determined based on a flow diagram illustrated in FIG. 30. At step S151, firstly, it is determined whether or not the cold accumulation of the cold accumulating material 44 is completed. Specifically, it is determined whether or not the cold accumulator air temperature T_c is reduced to lower than the solidifying temperature T_0 (8°C) of the cold accumulating material. In the seventeenth embodiment, the completion of the cold accumulation is determined when $T_c < 6^\circ\text{C}$ is satisfied.

Please replace the paragraph beginning on page 61, line 23, with the following new rewritten paragraph:

a According to the seventeenth embodiment, the cold accumulator 40 is disposed downstream of the evaporator 9, further, upstream of the air mixing door 19, without being dependent on the rotational position of the air mixing door 19. Therefore, the cold accumulator 40 can be excellently cooled by cold air after passing through the evaporator 9.

Please replace the paragraph beginning on page 62, line 11, with the following new rewritten paragraph:

a The eighteenth embodiment is for improving a reduction effect of drive power of the compressor 1 more than the seventeenth embodiment. When an actual traveling pattern of a vehicle is considered, in traveling of in an urban area in a city section, there are many cases having a traveling pattern that ~~such as repeating~~ repeats frequently that from ~~a reason in~~ waiting for a traffic signal or the like, and after ~~the~~ a short time traveling of a degree of one minute, after which the vehicle is stopped, and after thirty seconds, the vehicle restarts the traveling. On the other hand, in a suburban area, the ~~numbers~~ number of traffic signals are smaller than in an urban area, however, it is rare that a vehicle travels continuously for more than five minutes.

Please replace the paragraph beginning on page 63, line 6, with the following new rewritten paragraph:

a However, in an express-highway, it sometimes happens that once ~~start~~ the traveling starts, the vehicle continuously travels for 1-2 hours. In this case, when the cold accumulation state ($TEOB2 = 6^{\circ}\text{C}$) is continuously performed for a long time similar to the seventeenth embodiment, the drive power of the compressor 1 is wasted.

Please replace the paragraph beginning on page 63, line 18, with the following new rewritten paragraph:

a By paying attention to ~~the respect~~ what is described above, in the eighteenth embodiment, as illustrated in FIG. 31, when a completion of the cold accumulation is determined at step S151, it is determined whether or not an elapsed time after the completion of the cold accumulation passes a predetermined time τ at step S154. Here, the predetermined time τ is, for example, five minutes. When the elapsed time after the completion of the cold accumulation is within the predetermined time τ , the

Q same control as the seventeenth embodiment is performed at step S153, and the control of the cold accumulation maintenance with $TEOB2 = 6^{\circ}\text{C}$ is performed.

Please replace the paragraph beginning on page 64, line 9, with the following new rewritten paragraph:

Q According to the eighteenth embodiment, under a condition that the target evaporator temperature $TEOA$ for the air conditioning control is, for example, 12°C , after the predetermined time τ is elapsed after the completion of the cold accumulation, as illustrated in FIG. 32 the evaporator air temperature TEO can be increased to the temperature $TEOA$ of 12°C which is further a higher temperature than the solidifying point $T0$ of the cold accumulating material 44. With this contrivance, the power of the compressor 1 can be reduced to a level of the minimum necessity.

Please replace the paragraph beginning on page 65, line 2, with the following new rewritten paragraph:

Q In the seventeenth embodiment described above, also entire volume of air blown by the blower 11 is devised to pass through the evaporator 9. However, a bypass passage through which air bypasses both of the evaporator 9 and the cold accumulator 40 may be formed inside the air conditioning case 10, and an opening degree of the ~~bypath~~ bypass passage may be adjusted by a ~~bypath~~ bypass door.

Please replace the paragraph beginning on page 65, line 9, with the following new rewritten paragraph:

Q In the first and seventeenth embodiments described above, the temperature sensor 32 for detecting the evaporator air temperature T_e is utilized as temperature detecting ~~mean~~ means for detecting an air temperature blown from the evaporator 9.

a. However, a temperature sensor for detecting the temperature of a wall surface for a refrigerant passage of the evaporator 9 or a surface temperature of a fin may be utilized.

Please replace the paragraph beginning on page 65, line 16, with the following new rewritten paragraph:

a. Further, as the temperature detecting ~~mean~~ means for detecting the temperature of the cold accumulator 40, the temperature sensor 33 for detecting the air temperature Tc of the cold accumulator 40 is used. However, a temperature sensor for detecting the temperature of the wall surface of the cold accumulator 40 or the surface temperature of the fin of the cold accumulator 40 may be utilized.

Please replace the paragraph beginning on page 65, line 23, with the following new rewritten paragraph:

a. In the seventeenth embodiment described above, after the completion of cold accumulation of the cold accumulating material 44, the target evaporator temperature is switched to the target temperature TEOB2 slightly lower than the solidifying point T0 of the cold accumulating material 44 for maintaining the cold accumulation state of the cold accumulating material 44. However, when the ~~bypath~~ bypass passage through which cold air bypasses the cold accumulator 40 is provided, the ~~bypath~~ bypass passage is opened by a door and an air passage of the cold accumulator 40 is closed, after the completion of the cold accumulation of the cold accumulating material 44. Accordingly, in this case, air from the evaporator does not pass through the cold accumulator 40. In this way, after the completion of the cold accumulation, the target evaporator temperature can be immediately switched to the temperature TEOA (for

example, 12°C) required for air conditioning, and the cold accumulation state of the cold accumulating material 44 is allowed to be maintained. In this case, further improvement in the reduction effect of the power of the compressor 1 can be realized.

Please replace the paragraph beginning on page 66, line 16, with the following new rewritten paragraph:

In the embodiments described above, ~~in a case where~~ the temperature of the evaporator 9 is controlled by ~~intermission of the~~ intermittent operation of the compressor 1. However, when the compressor 1 is a well known variable displacement type, the temperature of the evaporator 9 can be controlled by an adjustment of a displacement of the compressor.

Please replace the paragraph beginning on page 66, line 27, with the following new rewritten paragraph:

In the embodiments described above, as a material of the cold accumulator 40, the aluminum is utilized. However, metals such as copper, iron and the like can be utilized other than aluminum. Further, the cold accumulator 40 may be made of a resin. When the cold accumulator 40 is made of resin, although heat transfer performance is lowered to some degree, manufacturing of the cold accumulator 40 becomes easy, and cost of the cold accumulator 40 can be reduced.